CENTERS FOR DISEASE CONTROL

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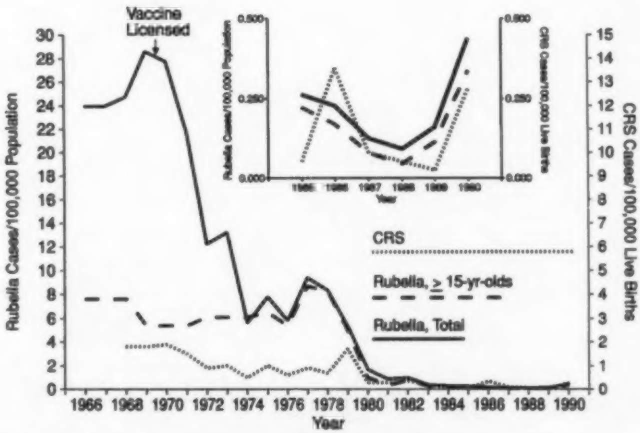
MORBIDITY AND MORTALITY WEEKLY REPORT

Current Trends

Increase in Rubella and Congenital Rubella Syndrome — United States, 1988–1990

In 1988, health departments in the United States reported an all-time low of 225 cases of rubella. However, in 1989, the number of reported cases increased nearly twofold, and in 1990, an additional threefold. As of January 4, 1991, a provisional total of 1093 cases (0.4 cases per 100,000 population) had been reported to the National Notifiable Disease Surveillance System (NNDSS) for 1990—the highest total since 1982 (Figure 1). This report summarizes the increase in rubella and congenital rubella syndrome (CRS) since 1988.

FIGURE 1. Incidence rates of reported rubella and congenital rubella syndrome (CRS)* — United States, 1966–1990†



*Cases reported to National Congenital Rubella Syndrome Registry.
†Provisional data for 1990.

Rubella and Congenital Rubella Syndrome — Continued

Rubella

In 1990, provisional rubella reports were received from 38 states and the District of Columbia, compared with 29 states and Puerto Rico in 1989 and 23 states and Puerto Rico in 1988 (Figure 2).* From 1988 through 1990, the incidence of rubella increased primarily in the West and Midwest. California, which reported half of U.S. cases in 1990, reported a nearly fourfold increase in reports from 1989 to 1990. Rubella outbreaks in Amish communities during 1990 resulted in a substantial increase in case reports from Minnesota, New York, and Ohio.

For all states except California, age-specific data on rubella case-patients are available in NNDSS for 1988 and 1989 (Table 1); data for 1990 are provisional. When compared with 1988, the largest age-specific increases in rubella incidence in 1989 occurred among persons aged ≥15 years and among infants aged <1 year. When compared with 1989, a greater proportion of cases in 1990 occurred among persons aged 1–14 years (Table 1), reflecting the contribution of outbreaks in religious communities that involved substantial numbers of cases among unvaccinated children. A CDC and local investigation in California determined that 325 (81%) of 400 cases reported with patient age from January through June 7, 1990, occurred among persons aged ≥15 years. Based on these findings and on NNDSS reports in 1990, the incidence rate of rubella in the United States from 1988 to 1990 increased most for persons aged 15–29 years (from 0.1 to 0.6 per 100,000 persons) and for persons aged ≥30 years (from 0.02 to 0.2 per 100,000).

Distinct outbreaks of rubella cannot be identified from data in NNDSS. Based on other information provided to CDC's Center for Prevention Services, 26 rubella outbreaks in 1990 could be distinguished and classified into two categories:

1. Outbreaks in which all cases occurred in or were linked to settings in which unvaccinated adults congregate (e.g., prisons, colleges, and workplaces). Ten outbreaks (nine from California and one from Michigan) occurred in prisons and involved from three to an estimated 36 persons. Four outbreaks (in California, Idaho, Montana, and New York) occurred in colleges and involved from six to an estimated 18 or more persons. Outbreaks among adults were also reported in the workplace and in community and recreational settings.
2. Outbreaks among children and adults in religious communities with low levels of rubella vaccination coverage. The three reported outbreaks in Amish communities included from nine to 128 reported cases. An outbreak involving at least 69 persons occurred in a different religious community in Oregon.

Data on vaccination status of rubella patients are not collected in NNDSS; however, the investigation in California obtained information on vaccination status on 61 (74%) of 82 patients identified in one county outbreak. For 53 (87%) of the 61 patients, no specific history of rubella vaccination was reported. Data obtained on 26 outbreaks reported to CDC in 1990 also indicate that vaccinated persons accounted for a relatively small number of rubella cases.

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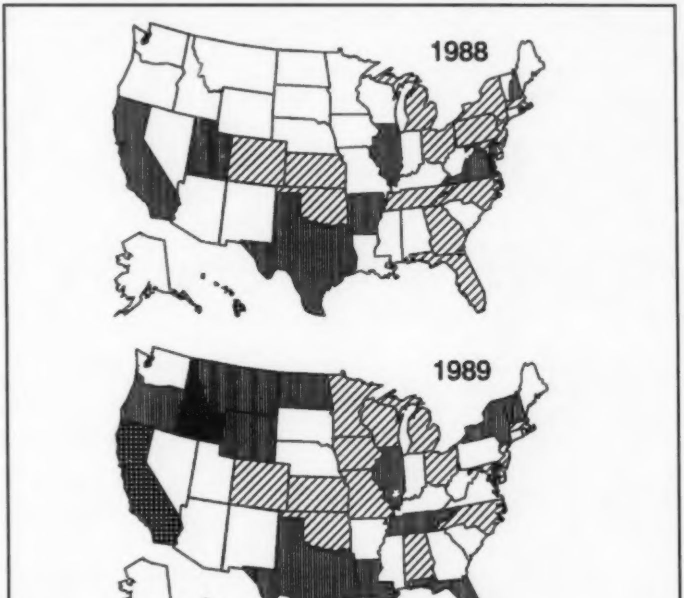
*Mississippi does not require reporting of rubella cases.

Rubella and Congenital Rubella Syndrome — Continued

FIGURE 2. Incidence rates* of reported rubella — United States,† 1988–1990§



*Per 100,000 population.
†Mississippi requires reporting of congenital rubella syndrome but not rubella cases.
§Provisional data for 1990 from weeks 1–52 in *MMWR*.
Sources: CDC and U.S. Bureau of the Census.

Rubella and Congenital Rubella Syndrome — Continued

Congenital Rubella Syndrome

For 1990, 10 confirmed[†] cases of CRS among infants born in the United States have been reported to CDC's National Congenital Rubella Syndrome Registry (NCRSR); laboratory confirmation is pending for an additional case compatible with CRS (Table 2).[§] As of January 4, 1991, CDC received five additional provisional reports of confirmed or compatible indigenous CRS cases. In contrast, during 1988 and 1989,

[†]Based on definitions recommended by the Council of State and Territorial Epidemiologists (CSTE), a confirmed CRS case is a case with both congenital anomalies and laboratory evidence of rubella infection in a person, and a compatible case is a case that satisfies selected clinical criteria without laboratory confirmation (*1*).

[§]Data on CRS are available from reports submitted weekly to NNDSS and from NCRSR maintained at CDC's Center for Prevention Services. The NNDSS CRS reports are case counts with demographic data and are tabulated by year of report. The NCRSR contains clinical and laboratory information on cases of CRS that are reported by state and local health departments. NCRSR cases are classified by year of patient's birth; data are considered provisional for any given year, because delays in diagnosis or reporting may result in updates of these figures.

TABLE 1. Age distribution of reported rubella case-patients and estimated incidence rates — United States,* 1988–1990, and California, 1990

	1988[†]			1989[†]			1990			
							U.S.[†§]			Adjusted
Age group (yrs)	No.	(%)	Rate[¶]	No.	(%)	Rate[¶]	No.	(%)	Calif.** (%)	U.S. rate[††]
<1	16	(12.6)	0.7	30	(13.0)	1.3	38	(7.2)	(5.2)	1.7
1–4	27	(21.3)	0.3	28	(12.1)	0.3	101	(19.0)	(4.5)	0.9
5–9	22	(17.3)	0.2	24	(10.4)	0.2	89	(16.8)	(5.0)	0.6
10–14	14	(11.0)	0.2	21	(9.1)	0.2	94	(17.7)	(4.0)	0.7
15–19	8	(6.3)	0.1	26	(11.3)	0.3	59	(11.1)	(6.3)	0.5
20–24	15	(11.8)	0.1	35	(15.1)	0.3	39	(7.4)	(19.2)	0.8
25–29	11	(8.7)	0.1	24	(10.4)	0.2	37	(7.0)	(22.8)	0.7
≥30	14	(11.0)	0.0	43	(18.6)	0.1	73	(13.8)	(33.0)	0.2
Total, known age	127	(100.0)	–	231	(100.0)	–	530	(100.0)		–
Total, unknown age	98	–	–	165	–	–	563	–		–
Total	**225**	–	**0.1**	**396**	–	**0.2**	**1093**	–		**0.4**

*Mississippi does not require reporting of rubella cases.

[†]Data by age excludes California.

[§]Provisional data provided as of January 4, 1991, to the National Notifiable Disease Surveillance System (NNDSS) through the National Electronic Telecommunications Surveillance System (NETSS) or by direct report. Age available only for case-patients reported through NETSS.

[¶]Cases per 100,000 population (based on projected census data), derived from extrapolating the age distribution of patients with known age to total cases.

**Age distribution found during CDC and local investigation of 411 cases reported in California from January 1 through June 7, 1990.

[††]Adjusted number of cases per 100,000 population (based on projected census data for 1989) derived from extrapolating 1) for 21 non-California patients reported without age, the age distribution of patients reported with age through NETSS to total non-California cases, and 2) for 542 California patients reported without age, the age distribution found during investigation of 411 cases reported January 1–June 7, 1990, to total California cases.

Rubella and Congenital Rubella Syndrome — Continued

two infants and one infant with CRS were born, respectively. In addition, a provisional total of three imported cases of CRS¶ has been reported for 1990.

Nine of the 11 CRS case-patients born in 1990 were born in southern California—five in Los Angeles County, two in Orange County, one in San Diego County, and one in Ventura County. The five provisional case-patients were born in Los Angeles County. In early 1990, a large outbreak of rubella occurred in Orange County; in the other three counties, reported rubella incidence increased less markedly or was unchanged. The other CRS cases were reported in Iowa and Montana.

Of the 11 mothers of the case-patients reported to NCRSR, five were white, five were Hispanic, and one was black; their median age was 23 years (range: 18–31 years). Although two women provided a specific history of rubella vaccination, these histories were not confirmed. One of these two mothers was reported to have had a positive test for rubella antibody before pregnancy; however, no serum specimens were available to assess prior immunity. An epidemiologic investigation is ongoing to further characterize the mothers of CRS case-patients and to identify missed opportunities for preventing rubella infection in these women.

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Editorial Note: Reports from health departments in 1990 indicate a moderate resurgence of rubella and a major increase in CRS in the United States. This resurgence followed a substantial reduction in reported rubella cases during the 1980s, which

¶Based on definitions approved by CSTE, an imported case of CRS is defined as CRS in a U.S. or non-U.S. citizen whose mother was outside the United States during her presumed exposure to rubella. If the timing of exposure to rubella cannot be determined, the mother must have been outside the United States throughout the 21 days before conception and the first 20 weeks of pregnancy.

TABLE 2. Number of cases and incidence rates* of congenital rubella syndrome (CRS)† reported to the National CRS Registry (NCRSR) — United States, 1969–1990

Year	NCRSR cases	Incidence rate	Year	NCRSR cases§	Incidence rate
1969	62	1.7	1980	14	0.4
1970	67	1.8	1981	10	0.3
1971	44	1.2	1982	13	0.4
1972	32	1.0	1983	7	0.2
1973	30	1.0	1984	2	<0.1
1974	22	0.7	1985	2	<0.1
1975	32	1.0	1986	13	0.4
1976	22	0.7	1987	3	<0.1
1977	29	0.9	1988	2	<0.1
1978	30	0.9	1989	1	<0.1
1979	57	1.6	1990	11¶	0.3¶

*Per 100,000 live births.
†Confirmed and compatible cases, reported by year of birth.
§Excluded are the following imported cases: 1984 (1 case), 1985 (1), 1986 (2), 1987 (3), 1988 (2), and 1990 (3).
¶Sixteen provisional NCRSR cases (incidence rate = 0.4 per 100,000 live births) for 52 weeks, as of January 4, 1991.

Rubella and Congenital Rubella Syndrome — Continued

was associated with an increased emphasis on vaccinating adolescents and adults, particularly women of childbearing age. From 1966 through 1987, rubella incidence decreased 96% in persons ≥20 years of age (*2*). However, because a substantial proportion (6%–25% [*3*]) of women of childbearing age remained susceptible, the potential risk for CRS persisted.

Many of the rubella outbreaks in 1990 occurred in settings in which adolescents and adults congregate and transmission to susceptible persons can occur. In California, at least 14 pregnant women were exposed to rubella as a result of prison or jail exposure.

For at least four reasons, the investigation of rubella in California suggested a true increase in rubella incidence in 1990, rather than an increase in diagnosis and reporting of rash illnesses because of widespread measles outbreaks. First, the age, race, and geographic distributions of rubella patients differed substantially from those of measles patients. Second, in 1990, rubella outbreaks occurred in nine state prisons or county jails, compared with one and three such outbreaks in 1988 and 1989, respectively. Third, the number of specimens submitted to the state laboratory for diagnostic rubella testing and the proportion that tested positive increased substantially from 1989 to 1990. Finally, the cluster of CRS cases occurred in southern California.

Despite the increased incidence of rubella in 1990, the rate for 1990 still represented a decline of 98% from that for 1966–1968 (24.3 per 100,000 population), the period immediately before vaccine licensure. Limited data from outbreaks reported in 1990 suggest that failure to vaccinate, rather than vaccine failure, has been responsible for the increase in rubella. This conclusion is supported by studies showing the long-term persistence of vaccine-induced immunity to rubella (*4*).

The goal of rubella vaccination is to prevent intrauterine rubella infection, which can result in miscarriage, stillbirth, or CRS or consideration of termination of pregnancy. In 1983, the average lifetime expenditure associated with providing care for an infant with CRS was estimated to exceed $200,000 (*5*). The increase in CRS cases reported in 1990 indicates a need to improve vaccination levels among adults, especially among women of childbearing age.

Several strategies may be necessary to improve rubella prevention and control and to better understand the epidemiology of rubella in the United States: 1) encouraging strong efforts by health-care providers and public health officials to implement the recommendations of the Immunization Practices Advisory Committee to improve rubella vaccine coverage levels among children and adults, particularly women of childbearing age (*6*); 2) establishing prevention and control programs in all correctional facilities; 3) initiating prompt and aggressive control measures whenever rubella outbreaks are reported; 4) increasing attention to the diagnosis and surveillance of rubella and CRS (e.g., in 21 states, the public health laboratory actively seeks rubella cases by performing rubella serologic testing on all specimens submitted for measles diagnosis that test negative for measles antibody); and 5) using population-based serologic surveys, rubella outbreak investigations, and special studies to determine the prevalence of rubella susceptibility, populations at risk, risk factors for nonvaccination, and missed or underused opportunities to vaccinate susceptible adults and adolescents. Because CRS is the most severe and preventable consequence of rubella infection, CRS cases should be identified and investigated to estimate incidence and identify opportunities to prevent rubella infection in mothers (*7,8*).

Rubella and Congenital Rubella Syndrome — Continued

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Birth Defects among Low Birth Weight Infants — Metropolitan Atlanta, 1978–1988

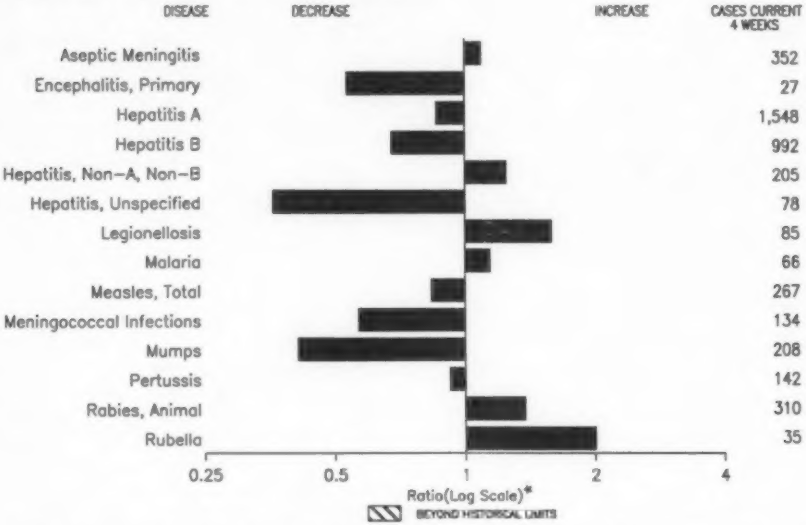
Approximately 3%–4% of newborn infants have a major birth defect diagnosed during their first year of life (*1*). Because many infants with birth defects are born prematurely and/or have intrauterine growth retardation (*2–5*), the rate of birth defects is expected to vary by birth weight. This report summarizes a population-based study of the relation between birth defect rates and the birth weight of infants born in metropolitan Atlanta from 1978 through 1988.

Data from the population-based Metropolitan Atlanta Congenital Defects Program (MACDP) for 1978–1988 were used to study the rate of birth defects in infants in five birth-weight categories (≤1499 g [≤3 lbs 4 oz], 1500–1999 g [3 lbs 5 oz–4 lbs 7 oz], 2000–2499 g [4 lbs 8 oz–5 lbs 7 oz], 2500–3999 g [5 lbs 8 oz–8 lbs 13 oz], and ≥4000 g [≥8 lbs 14 oz]). The MACDP ascertains birth defects among all infants whose mothers reside in one of five counties of the metropolitan Atlanta area. Cases include live-born and stillborn infants (≥20 weeks gestation or weighing ≥500 g [1 lb]) with major or serious structural defects diagnosed in the first year of life (*6*). However, this analysis was restricted to live-born singleton infants. Birth defect rates were determined by dividing the number of singleton live-born infants with birth defects registered in the MACDP during 1978–1988 by the total number of singleton live births in the five-county metropolitan Atlanta area during the same period. Rate ratios (RRs) were calculated by dividing the rate of birth defects for infants in each birth-weight category by that of infants weighing 2500–3999 g.

Overall, 3.6% of singleton infants born in metropolitan Atlanta during 1978–1988 had major birth defects. Infants in low-birth-weight (LBW) classes (≤2499 g) were at 1.8 times higher risk of having birth defects than were those weighing 2500–3999 g (95% confidence interval [CI]=1.7–1.8). Specifically, 17% of white infants (RR=5.8) and 16% of infants of other races (RR=4.4) weighing ≤1499 g had birth defects; 16% of white infants (RR=5.3) and 12% of infants of other races (RR=3.3) weighing 1500–1999 g had birth defects; and 7% of white infants (RR=2.4) and 6% of infants of

(Continued on page 105)

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending February 9, 1991, with historical data — United States



*Ratio of current 4-week total to the mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of selected notifiable diseases, United States, cumulative, week ending February 9, 1991 (6th Week)

	Cum. 1991		Cum. 1991
AIDS	4,081	Measles: imported	11
Anthrax	-	indigenous	309
Botulism: Foodborne	-	Plague	-
Infant	6	Poliomyelitis, Paralytic*	-
Other	-	Psittacosis	5
Brucellosis	8	Rabies, human	-
Cholera	-	Syphilis, primary & secondary	4,577
Congenital rubella syndrome	2	Syphilis, congenital, age < 1 year	-
Diphtheria	1	Tetanus	-
Encephalitis, post-infectious	3	Toxic shock syndrome	42
Gonorrhea	62,386	Trichinosis	-
Haemophilus influenzae (invasive disease)	195	Tuberculosis	1,712
Hansen disease	12	Tularemia	2
Leptospirosis	10	Typhoid fever	36
Lyme disease	32	Typhus fever, tickborne (RMSF)	9

*No cases of suspected poliomyelitis have been reported in 1991; none of the 6 suspected cases in 1990 have been confirmed to date. Five of the 13 suspected cases in 1989 were confirmed and all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending February 9, 1991, and February 10, 1990 (6th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis: Primary	Encephalitis: Post-infectious	Gonorrhea		Hepatitis (Viral), by type: A	B	NA,NB	Unspecified	Legionellosis	Lyme Disease
	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	4,081	509	41	3	62,386	79,258	2,245	1,346	321	122	117	32
NEW ENGLAND	176	23	6	-	2,306	2,345	67	101	14	4	12	7
Maine	15	2	2	-	12	27	4	1	1	-	-	-
N.H.	5	2	-	-	36	26	3	4	1	-	1	-
Vt.	3	-	-	-	10	9	3	1	-	-	-	-
Mass.	70	8	2	-	789	841	38	88	12	3	11	6
R.I.	9	11	-	-	119	124	11	6	-	1	-	1
Conn.	74	-	2	-	1,340	1,318	8	1	-	-	-	-
MID. ATLANTIC	908	81	1	1	4,985	8,435	187	100	9	-	32	-
Upstate N.Y.	110	25	1	1	1,284	1,346	97	49	5	-	9	-
N.Y. City	381	9	-	-	-	3,926	25	6	-	-	3	-
N.J.	284	-	-	-	1,067	1,966	10	4	1	-	-	-
Pa.	133	47	-	-	2,634	1,197	55	41	3	-	20	-
E.N. CENTRAL	378	82	3	1	12,076	16,753	176	144	76	7	17	8
Ohio	59	31	2	1	3,515	5,594	75	45	23	4	13	4
Ind.	24	5	-	-	1,390	1,309	26	12	-	-	-	-
Ill.	213	9	-	-	4,017	4,858	1	1	-	-	-	-
Mich.	54	35	1	-	2,884	3,966	34	64	11	3	4	4
Wis.	28	2	-	-	270	1,026	40	22	42	-	-	-
W.N. CENTRAL	137	36	6	-	3,373	4,683	325	26	22	2	9	1
Minn.	35	8	5	-	384	484	23	1	-	1	2	-
Iowa	14	13	-	-	246	346	12	3	1	-	-	1
Mo.	77	5	-	-	1,997	2,560	58	15	21	1	4	-
N. Dak.	-	-	-	-	-	32	3	-	-	-	-	-
S. Dak.	-	3	1	-	46	32	189	-	-	-	1	-
Nebr.	4	6	-	-	273	208	31	6	-	-	2	-
Kans.	7	1	-	-	447	1,021	9	1	-	-	-	-
S. ATLANTIC	990	111	7	1	20,419	22,694	161	349	48	14	16	5
Del.	5	4	-	-	215	301	4	9	1	-	-	1
Md.	100	18	3	-	2,233	2,608	44	48	15	2	6	2
D.C.	70	8	-	-	1,342	825	11	13	-	1	-	-
Va.	93	12	-	-	1,637	1,931	19	23	2	8	1	1
W. Va.	5	2	-	-	145	157	3	5	-	1	-	-
N.C.	41	25	2	-	4,132	4,129	32	99	25	-	5	1
S.C.	49	6	-	-	1,806	2,165	6	79	1	-	3	-
Ga.	220	5	1	1	5,025	5,377	17	48	-	-	1	-
Fla.	407	31	1	-	3,884	5,201	25	25	4	2	-	-
E.S. CENTRAL	98	46	2	-	4,894	6,361	23	123	40	2	9	3
Ky.	18	16	-	-	611	719	5	33	1	2	5	1
Tenn.	34	13	2	-	1,295	1,752	10	75	38	-	2	2
Ala.	29	15	-	-	1,630	2,506	8	15	1	-	2	-
Miss.	17	2	-	-	1,358	1,384	-	-	-	-	-	-
W.S. CENTRAL	376	32	5	-	6,923	7,089	166	75	7	8	4	-
Ark.	14	24	1	-	721	901	40	-	-	-	-	-
La.	72	2	-	-	1,325	1,547	15	31	1	-	1	-
Okla.	5	1	3	-	778	667	63	28	6	4	3	-
Tex.	285	5	1	-	4,099	3,974	48	16	-	4	-	-
MOUNTAIN	88	21	3	-	1,104	1,803	451	92	15	36	11	-
Mont.	3	1	-	-	8	15	17	14	-	2	-	-
Idaho	1	-	-	-	15	12	6	8	-	-	-	-
Wyo.	2	-	-	-	4	21	8	1	-	-	-	-
Colo.	45	3	-	-	252	585	17	15	6	5	1	-
N. Mex.	9	1	-	-	87	133	177	7	-	13	-	-
Ariz.	8	10	3	-	497	657	158	32	3	13	4	-
Utah	3	2	-	-	45	58	54	5	3	3	4	-
Nev.	17	4	-	-	196	322	14	10	3	-	2	-
PACIFIC	930	77	8	-	6,306	9,095	689	336	90	49	7	8
Wash.	33	-	-	-	497	925	67	46	12	1	-	-
Oreg.	16	-	-	-	240	323	45	25	12	1	-	-
Calif.	860	68	8	-	5,376	7,630	562	254	61	46	6	8
Alaska	3	2	-	-	104	151	11	4	4	1	-	-
Hawaii	18	7	-	-	89	66	4	7	1	-	1	-
Guam	-	-	-	-	-	31	-	-	-	-	-	-
P.R.	181	12	-	-	35	152	-	4	-	3	-	-
V.I.	-	-	-	-	40	59	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	-	9	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	25	-	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending February 9, 1991, and February 10, 1990 (6th Week)

Reporting Area	Malaria	Measles (Rubeola)					Meningococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	1991	Cum. 1991	Cum. 1990
UNITED STATES	85	86	309	2	11	1,298	177	49	275	47	199	333	4	40	36
NEW ENGLAND	7	-	-	-	-	15	21	6	7	10	18	54	-	-	1
Maine	-	-	-	-	-	1	2	-	-	2	3	1	-	-	-
N.H.	-	-	-	-	-	6	5	-	-	-	7	6	-	-	-
Vt.	1	-	-	-	-	-	2	-	-	-	-	1	-	-	-
Mass.	4	-	-	-	-	-	11	-	-	8	8	43	-	-	-
R.I.	2	-	-	-	-	-	-	1	2	-	-	-	-	-	1
Conn.	-	-	-	-	-	8	1	5	5	-	-	3	-	-	-
MID. ATLANTIC	8	32	120	-	-	94	19	3	25	7	32	67	-	-	-
Upstate N.Y.	3	-	-	-	-	54	9	3	11	6	16	52	-	-	-
N.Y. City	3	U	-	U	-	7	-	U	-	U	-	-	U	-	-
N.J.	-	U	3	U	-	9	1	U	-	U	1	8	U	-	-
Pa.	2	32	117	-	-	24	9	-	14	1	15	7	-	-	-
E.N. CENTRAL	6	-	1	-	1	880	21	3	31	7	34	104	-	-	3
Ohio	-	-	-	-	-	44	6	-	-	-	23	15	-	-	-
Ind.	1	-	-	-	-	3	1	-	1	4	4	26	-	-	-
Ill.	-	-	-	-	-	367	-	-	16	-	-	30	-	-	3
Mich.	5	-	1	-	-	144	10	3	13	3	6	8	-	-	-
Wis.	-	-	-	-	1	322	4	-	1	-	1	25	-	-	-
W.N. CENTRAL	1	-	-	-	-	40	3	1	8	1	15	9	-	1	-
Minn.	-	-	-	-	-	-	-	-	2	-	7	1	-	1	-
Iowa	-	-	-	-	-	19	-	-	3	1	4	-	-	-	-
Mo.	1	-	-	-	-	21	1	-	2	-	1	6	-	-	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
S. Dak.	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-
Kans.	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
S. ATLANTIC	22	-	1	1	1	41	38	22	112	1	9	37	-	4	1
Del.	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
Md.	9	-	-	-	-	18	8	7	47	-	-	15	-	3	-
D.C.	-	-	-	-	-	1	-	-	3	-	-	1	-	-	-
Va.	3	-	-	-	-	5	3	-	6	-	2	2	-	-	-
W. Va.	1	-	-	-	-	-	1	1	3	-	-	5	-	-	-
N.C.	-	-	-	-	-	-	12	1	32	-	5	5	-	1	-
S.C.	4	-	-	-	-	-	3	10	14	-	-	-	-	-	-
Ga.	2	-	-	-	-	1	4	3	3	1	1	4	-	-	-
Fla.	3	-	1	1†	1	15	7	-	4	-	1	3	-	-	1
E.S. CENTRAL	1	-	2	-	-	12	19	-	2	-	5	11	-	-	-
Ky.	-	-	2	-	-	-	6	-	-	-	-	-	-	-	-
Tenn.	-	-	-	-	-	9	4	-	-	-	3	2	-	-	-
Ala.	1	-	-	-	-	-	9	-	1	-	2	9	-	-	-
Miss.	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-
W.S. CENTRAL	2	-	-	-	5	20	6	2	17	-	9	2	-	-	-
Ark.	-	-	-	-	5	-	-	1	4	-	-	-	-	-	-
La.	1	-	-	-	-	-	6	1	5	-	6	1	-	-	-
Okla.	1	-	-	-	-	3	-	-	1	-	3	1	-	-	-
Tex.	-	-	-	-	-	17	-	-	7	-	-	-	-	-	-
MOUNTAIN	2	8	26	1	3	9	8	3	16	9	33	19	-	1	-
Mont.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	1	-	-	-	7	2	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
Colo.	-	-	-	1§	1	3	2	1	3	7	10	12	-	-	-
N. Mex.	-	8	17	-	2	-	-	N	N	-	3	-	-	-	-
Ariz.	2	-	2	-	-	6	3	2	13	1	7	4	-	-	-
Utah	-	-	-	-	-	-	-	-	-	-	5	1	-	-	-
Nev.	-	U	7	U	-	-	-	U	-	U	-	-	U	1	-
PACIFIC	36	46	159	-	1	187	42	9	57	12	44	30	4	34	31
Wash.	4	-	-	-	-	9	2	1	4	1	4	3	-	-	-
Oreg.	1	-	-	-	-	3	5	N	N	-	4	5	-	-	-
Calif.	30	46	157	-	1	175	34	8	48	9	21	19	3	33	27
Alaska	-	-	-	-	-	-	1	-	3	-	4	-	-	-	-
Hawaii	1	-	2	-	-	-	-	-	2	2	11	3	1	1	4
Guam	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
P.R.	-	-	-	-	-	2	1	1	1	1	1	-	-	-	-
V.I.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending February 9, 1991, and February 10, 1990 (6th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	4,577	4,802	42	1,712	2,017	2	36	9	410
NEW ENGLAND	122	204	3	48	26	-	4	2	-
Maine	-	1	2	-	-	-	-	-	-
N.H.	1	23	-	-	1	-	-	-	-
Vt.	1	-	-	-	1	-	-	-	-
Mass.	62	64	1	14	8	-	4	2	-
R.I.	5	-	-	15	7	-	-	-	-
Conn.	52	116	-	19	9	-	-	-	-
MID. ATLANTIC	729	930	6	318	526	-	3	-	153
Upstate N.Y.	54	47	2	19	67	-	1	-	43
N.Y. City	291	669	-	236	360	-	2	-	-
N.J.	116	176	-	51	40	-	-	-	46
Pa.	268	38	4	12	59	-	-	-	64
E.N. CENTRAL	517	324	8	191	192	-	4	-	4
Ohio	54	51	6	52	23	-	-	-	1
Ind.	10	4	-	5	14	-	-	-	-
Ill.	285	146	-	120	111	-	-	-	-
Mich.	110	81	2	-	35	-	4	-	-
Wis.	58	42	-	14	9	-	-	-	3
W.N. CENTRAL	70	42	10	45	56	-	1	-	41
Minn.	9	12	6	2	12	-	1	-	25
Iowa	8	4	3	9	4	-	-	-	3
Mo.	53	20	1	22	20	-	-	-	-
N. Dak.	-	1	-	2	4	-	-	-	7
S. Dak.	-	-	-	2	4	-	-	-	-
Nebr.	-	2	-	1	7	-	-	-	2
Kans.	-	3	-	7	5	-	-	-	4
S. ATLANTIC	1,438	1,706	2	214	286	-	8	4	121
Del.	14	21	1	4	7	-	-	-	15
Md.	145	147	-	24	27	-	4	-	55
D.C.	87	42	-	21	6	-	-	-	-
Va.	114	76	-	20	18	-	1	-	18
W. Va.	4	2	-	9	5	-	1	-	7
N.C.	194	196	1	50	32	-	-	4	-
S.C.	203	114	-	30	49	-	-	-	5
Ga.	323	457	-	42	39	-	2	-	19
Fla.	354	652	-	14	103	-	-	-	2
E.S. CENTRAL	482	409	1	127	107	-	-	2	8
Ky.	8	9	-	33	36	-	-	1	3
Tenn.	231	136	-	-	28	-	-	-	-
Ala.	116	148	1	48	34	-	-	1	5
Miss.	127	117	-	46	9	-	-	-	-
W.S. CENTRAL	689	577	1	189	252	1	-	1	34
Ark.	53	28	-	18	32	1	-	-	4
La.	211	229	-	46	64	-	-	-	2
Okla.	22	30	1	3	12	-	-	1	15
Tex.	403	290	-	122	144	-	-	-	13
MOUNTAIN	70	77	6	56	31	1	1	-	5
Mont.	1	-	-	-	-	1	-	-	2
Idaho	2	1	-	-	-	-	-	-	1
Wyo.	1	-	-	-	1	-	-	-	-
Colo.	8	9	-	6	-	-	-	-	1
N. Mex.	3	7	1	-	8	-	-	-	-
Ariz.	48	48	2	36	11	-	1	-	1
Utah	-	1	3	13	-	-	-	-	-
Nev.	7	11	-	1	11	-	-	-	-
PACIFIC	460	533	5	524	541	-	15	-	44
Wash.	20	58	-	20	29	-	-	-	-
Oreg.	12	9	-	7	14	-	-	-	-
Calif.	427	455	5	473	462	-	14	-	44
Alaska	1	4	-	1	9	-	-	-	-
Hawaii	-	7	-	23	27	-	1	-	-
Guam	-	-	-	-	7	-	-	-	-
P.R.	24	56	-	15	6	-	-	-	3
V.I.	2	-	-	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	3	-	-	-	-
C.N.M.I.	-	-	-	-	6	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending February 9, 1991 (6th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	573	430	76	50	6	11	60
Boston, Mass.	180	118	29	26	1	6	16
Bridgeport, Conn.	52	43	3	5	1	-	5
Cambridge, Mass.	22	21	1	-	-	-	4
Fall River, Mass.	17	13	3	1	-	-	-
Hartford, Conn.§	U	U	U	U	U	U	U
Lowell, Mass.	33	27	4	1	-	1	2
Lynn, Mass.	15	12	1	1	1	-	1
New Bedford, Mass.	26	23	2	1	-	-	2
New Haven, Conn.	45	31	6	6	1	1	3
Providence, R.I.	28	20	6	-	2	-	5
Somerville, Mass.	1	-	-	1	-	-	1
Springfield, Mass.	56	48	7	-	-	1	7
Waterbury, Conn.	28	19	4	5	-	-	2
Worcester, Mass.	70	55	10	3	-	2	12
MID. ATLANTIC	2,740	1,798	498	301	64	77	161
Albany, N.Y.	39	30	5	2	2	-	6
Allentown, Pa.	13	11	1	-	1	-	-
Buffalo, N.Y.	100	66	22	5	4	3	5
Camden, N.J.	38	24	12	2	-	-	2
Elizabeth, N.J.§	U	U	U	U	U	U	U
Erie, Pa.†	35	30	4	1	-	-	4
Jersey City, N.J.	52	33	7	7	1	4	1
N.Y. City, N.Y.	1,444	879	275	209	35	46	68
Newark, N.J.	63	24	21	11	2	5	5
Paterson, N.J.	39	23	8	4	2	2	2
Philadelphia, Pa.	408	288	73	32	7	6	18
Pittsburgh, Pa.†	63	42	13	2	2	4	1
Reading, Pa.	46	40	5	1	-	-	9
Rochester, N.Y.	138	105	15	11	4	3	13
Schenectady, N.Y.	28	26	1	-	1	-	5
Scranton, Pa.†	31	18	10	3	-	-	2
Syracuse, N.Y.	91	74	10	5	1	1	12
Trenton, N.J.	50	36	10	2	-	2	6
Utica, N.Y.	19	13	4	1	1	-	-
Yonkers, N.Y.	43	36	2	3	1	1	2
E.N. CENTRAL	2,547	1,780	455	143	65	104	139
Akron, Ohio	55	38	10	4	1	2	-
Canton, Ohio	33	27	4	2	-	-	2
Chicago, Ill.	669	516	74	13	24	42	26
Cincinnati, Ohio	156	102	33	12	3	6	21
Cleveland, Ohio	165	95	39	17	5	9	2
Columbus, Ohio	196	126	38	19	5	8	7
Dayton, Ohio	121	85	25	6	1	4	5
Detroit, Mich.	262	156	66	27	6	7	7
Evansville, Ind.	38	30	7	1	-	-	2
Fort Wayne, Ind.	74	52	19	1	2	-	7
Gary, Ind.	27	19	7	1	-	-	2
Grand Rapids, Mich.	67	52	8	2	-	5	6
Indianapolis, Ind.	169	103	42	15	4	5	11
Madison, Wis.	41	27	9	5	-	-	2
Milwaukee, Wis.	145	112	25	6	1	1	7
Peoria, Ill.	58	41	10	2	3	2	3
Rockford, Ill.	50	35	9	1	1	4	12
South Bend, Ind.	44	28	10	2	3	1	9
Toledo, Ohio	100	77	15	5	-	3	7
Youngstown, Ohio	77	59	5	2	6	5	1
W.N. CENTRAL	882	642	147	50	15	28	51
Des Moines, Iowa	77	59	14	-	1	3	7
Duluth, Minn.	25	23	1	-	1	-	-
Kansas City, Kans.	44	32	8	1	2	1	2
Kansas City, Mo.	119	83	25	9	2	-	5
Lincoln, Nebr.	47	37	5	3	1	1	5
Minneapolis, Minn.	252	180	46	15	4	7	14
Omaha, Nebr.	73	53	12	6	-	2	5
St. Louis, Mo.	128	95	14	9	3	7	5
St. Paul, Minn.	58	38	13	5	-	2	6
Wichita, Kans.	59	42	9	2	1	5	2
S. ATLANTIC	1,415	840	299	141	53	82	56
Atlanta, Ga.	219	99	50	30	6	34	6
Baltimore, Md.	202	120	48	19	10	5	11
Charlotte, N.C.	82	50	15	7	6	4	1
Jacksonville, Fla.	135	87	28	9	4	7	7
Miami, Fla.	129	70	32	19	6	2	1
Norfolk, Va.	57	39	10	6	-	2	2
Richmond, Va.	80	61	10	7	1	1	6
Savannah, Ga.	34	19	7	5	2	1	1
St. Petersburg, Fla.	68	56	10	1	-	1	1
Tampa, Fla.	177	120	34	10	6	7	14
Washington, D.C.	203	98	49	26	12	18	6
Wilmington, Del.	29	21	6	2	-	-	-
E.S. CENTRAL	800	518	190	51	15	26	47
Birmingham, Ala.	130	69	32	13	6	10	7
Chattanooga, Tenn.	75	49	18	3	1	4	8
Knoxville, Tenn.	98	68	22	5	3	-	13
Louisville, Ky.	174	119	35	13	1	6	7
Memphis, Tenn.	168	116	39	8	3	2	-
Mobile, Ala.§	U	U	U	U	U	U	U
Montgomery, Ala.	44	28	13	2	1	-	2
Nashville, Tenn.	111	69	31	7	-	4	10
W.S. CENTRAL	1,368	861	275	142	40	50	104
Austin, Tex.	72	49	12	7	3	1	8
Baton Rouge, La.	37	24	8	4	-	1	1
Corpus Christi, Tex.	59	38	10	8	1	2	2
Dallas, Tex.	210	118	43	28	10	11	7
El Paso, Tex.	89	64	15	7	2	1	11
Fort Worth, Tex.	108	71	14	14	4	5	8
Houston, Tex.	353	206	76	43	13	15	44
Little Rock, Ark.	57	29	15	9	2	2	3
New Orleans, La.	75	45	18	3	3	6	-
San Antonio, Tex.	157	104	35	13	2	3	6
Shreveport, La.	74	55	14	2	-	3	5
Tulsa, Okla.	77	58	15	4	-	-	9
MOUNTAIN	762	514	137	62	22	27	42
Albuquerque, N. Mex.	84	55	18	8	1	2	3
Colo. Springs, Colo.	51	35	10	3	1	2	5
Denver, Colo.	114	68	21	13	7	5	4
Las Vegas, Nev.	121	80	25	10	-	6	12
Ogden, Utah	15	12	2	1	-	-	3
Phoenix, Ariz.	183	127	26	16	6	8	4
Pueblo, Colo.	35	26	5	2	2	-	2
Salt Lake City, Utah	44	24	9	3	4	4	4
Tucson, Ariz.	115	87	21	6	1	-	5
PACIFIC	2,314	1,520	425	222	74	63	160
Berkeley, Calif.	14	12	2	-	-	-	-
Fresno, Calif.	159	121	24	9	1	4	23
Glendale, Calif.	32	24	5	2	1	-	2
Honolulu, Hawaii	91	60	19	6	1	5	11
Long Beach, Calif.	89	58	21	5	2	3	11
Los Angeles Calif.	784	483	157	92	32	10	40
Oakland, Calif.§	U	U	U	U	U	U	U
Pasadena, Calif.	34	20	1	1	4	8	1
Portland, Oreg.	136	100	20	10	4	2	2
Sacramento, Calif.	185	126	36	14	4	5	21
San Diego, Calif.	142	86	31	12	8	5	20
San Francisco, Calif.	186	107	34	37	3	5	5
San Jose, Calif.	200	135	35	15	6	9	17
Seattle, Wash.	136	91	19	16	5	5	1
Spokane, Wash.	52	38	10	2	-	2	2
Tacoma, Wash.	74	59	11	1	3	-	4
TOTAL	13,401††	8,903	2,502	1,162	354	468	820

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Report for this week is unavailable (U).

Birth Defects — Continued

other races (RR=1.6) weighing 2000–2499 g had birth defects (Table 1). Infants weighing ≥4000 g were at a slightly lower risk of having birth defects than were those weighing 2500–3999 g (RR=0.9; 95% CI=0.8–0.9). Measures of the association between birth weight and birth defects did not vary when stratified by maternal age, birth period, and infants' sex. In addition, analyses by type of defect indicated that 26 of the 37 specific defects examined were associated with LBW ($p<0.05$).

Reported by: Birth Defects and Genetic Disease Br, Div of Birth Defects and Developmental Disabilities, Center for Environmental Health and Injury Control, CDC.

Editorial Note: The findings in this report indicate that, although the overall rate of serious birth defects in singleton live-born infants born in metropolitan Atlanta was 3%–4%, the rate varied greatly by birth-weight category. These findings have implications for clinical care, surveillance, and prevention. First, birth defects contribute to increased morbidity and mortality among LBW infants and are often associated with costly medical and surgical care that compounds medical problems related to LBW. Second, an increasing number of statewide programs are conducting or planning birth defect surveillance activities. Because LBW infants are at high risk for birth defects, targeting medical records of LBW infants should improve the overall ascertainment of birth defects in the population. Finally, because a substantial proportion of LBW infants have associated birth defects, public health prevention strategies targeted at LBW should consider the complex etiology and pathogenesis of LBW and attempt to better delineate and prevent risk factors that influence the occurrence of birth defects.

TABLE 1. Rates of major birth defects* among singleton live-born infants, by birth weight and race — metropolitan Atlanta, 1978–1988

Birth weight (g)	Race	No. live births	No. with birth defects	Rate†	Rate ratio (95% CI§)	
≤1,499	White	1,617	277	171	5.8	(5.2–6.5)
	Other	2,745	429	156	4.4	(4.0–4.9)
	Total	4,362	706	162	5.1	(4.8–5.5)
1,500–1,999	White	1,806	280	155	5.3	(4.7–5.9)
	Other	2,564	297	116	3.3	(2.9–3.7)
	Total	4,370	577	132	4.2	(3.8–4.5)
2,000–2,499	White	6,181	438	71	2.4	(2.2–2.6)
	Other	8,050	446	55	1.6	(1.4–1.7)
	Total	14,231	884	62	2.0	(1.8–2.1)
2,500–3,999	White	160,236	4,723	29	1.0	(reference)
	Other	102,630	3,622	35	1.0	(reference)
	Total	262,866	8,345	32	1.0	(reference)
≥4,000	White	24,780	674	27	0.9	(0.9–1.0)
	Other	6,890	212	31	0.9	(0.8–1.0)
	Total	31,670	886	28	0.8	(0.8–0.9)

*Birth defects considered secondary to prematurity are excluded among low birth weight infants (patent ductus arterious, patent foramen ovale, pulmonary hypoplasia, hydrocephalus associated with intraventricular hemorrhage, and undescended testicles).

†Per 1000 live births.

§Confidence interval.

Birth Defects — Continued

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Epidemiologic Notes and Reports

Mosquito-Transmitted Malaria — California and Florida, 1990

In 1990, two persons—one each in California and Florida—were diagnosed with malaria classified as cryptic*; their infections may have been acquired in the United States through bites of mosquitoes that became infected after biting parasitemic migrant workers.

California

On July 30, a teenaged male resident of Oceanside in north San Diego County presented to a physician's office with an 11-day history of fever, malaise, and myalgia. *Plasmodium vivax* parasites were identified during a blood smear examination. On hospital admission, the patient had splenomegaly and a hemoglobin level of 5.9 gm%. He was treated with chloroquine and primaquine and recovered.

The San Diego Department of Health Services conducted an epidemiologic investigation to determine the source of his infection. The patient had no history of foreign travel, intravenous (IV)-drug use, or blood transfusions. He lives in a suburban housing development within ½ mile of the San Luis Rey River. The open area between his house and the river is flat, with heavy vegetation near the river. In the evenings, he frequently visited a nearby park within 150 yards of the river. Several encampments of migrant workers employed at local farms were identified along the river. No history of malaria-like illness was elicited from migrant workers in these encampments; no malaria cases were reported among these migrant workers or among other residents of Oceanside.

Entomologic investigations along the river during August 1–6 identified larvae and adult mosquitoes of *Anopheles hermsi*, a competent mosquito vector for malaria. No anopheline mosquitoes were identified near the patient's residence. Control measures consisted of larviciding mosquito breeding sites with oil and fogging with pyrethrins along the riverbed.

Florida

On June 8, a female resident of Bay County in the Florida Panhandle consulted a physician because of a 5-day history of remittent fever, chills, myalgia, and

*An isolated case of malaria ascertained by appropriate epidemiologic investigation not to be associated with secondary cases (*1*).

Malaria — Continued

headaches. *P. vivax* parasites were identified on a peripheral blood smear. She was treated with chloroquine and primaquine and recovered.

The Florida Department of Health and Rehabilitative Services conducted an epidemiologic investigation to determine the source of her infection. The woman had no history of foreign travel, blood transfusion, or IV-drug use. A survey of medical-care providers in Bay County and neighboring Gulf County did not identify other cases of malaria or unexplained febrile episodes within the previous 3 months. The patient and her family had spent the nights of May 19 and 27 sleeping outdoors in a campground in Gulf County, 30 miles from her home. Mosquito activity and biting at night was reportedly intense.

A door-to-door survey of residents of this campground and follow-up visits with the owner of the campground did not identify any suspected cases of malaria. In May, a large fish farm contiguous to the campsite had employed approximately 40 migrant workers, many of whom came from Mexico and Central America. None of the migrant workers were known to have had symptoms compatible with malaria. Health-care providers in the area had not treated any patients with malaria-like symptoms. Efforts to trace and survey the migrant workers were unsuccessful.

On June 14, approximately 50 *A. quadrimaculatus,* a competent mosquito vector of malaria, were caught in light traps near the campsite. Control measures included ultralow-volume spraying with malathion.

Reported by: M Ginsberg, MD, S Hunt, M Bartzen, A Caudillo, MD, D Ramras, MD, M Mizrahi, San Diego Dept of Health Svcs; RR Roberto, MD, Infectious Disease Br, GW Rutherford, III, MD, State Epidemiologist, California Dept of Health Svcs. S McClellan, MD, T Smith, MD, Panama City; P Sylvester, MD, J Cerosimo, MD, BW Clements, RA Calder, MD, State Epidemiologist, Florida Dept of Health and Rehabilitative Svcs. Malaria Br, Div of Parasitic Diseases, Center for Infectious Diseases, CDC.

Editorial Note: Both of the malaria cases described here were classified as cryptic. However, both persons may have acquired their infections in the United States through bites of mosquitoes that became infected after biting parasitemic migrant workers.

Transmission of mosquitoborne *P. vivax* malaria in San Diego County has occurred intermittently since 1986 (*2,3*). These episodes have shared several common features: 1) identification of the initial case(s) usually in residents; 2) limited access to medical care for migrant workers from countries with endemic malaria, resulting in delays both in identification and treatment of parasitemic persons and in institution of control measures; 3) presence of standing water and lack of adequate sanitary facilities and shelter in migrant workers' encampments; and 4) proximity of competent *Anopheles* vectors and a susceptible population. In contrast, although *A. quadrimaculatus* is widespread in Florida, no cases of suspected or confirmed mosquitoborne malaria infections have been identified since 1948.

In other states, conditions may be similar to those in Florida and California (i.e., large populations of migrant workers and conducive environmental conditions), especially in the Southwest and along the Gulf of Mexico. Health-care providers should be aware of the potential for introduced malaria in both migrant workers and local residents. In these areas, malaria should be included in the differential diagnosis of any patient with a fever of unknown origin. When malaria infection is diagnosed, physicians should inquire about recent travel, previous malaria infections, IV-drug use, and blood transfusions. Prompt reporting of confirmed malaria infections will aid health departments in immediately investigating potential local transmission.

Malaria — Continued

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International Notes

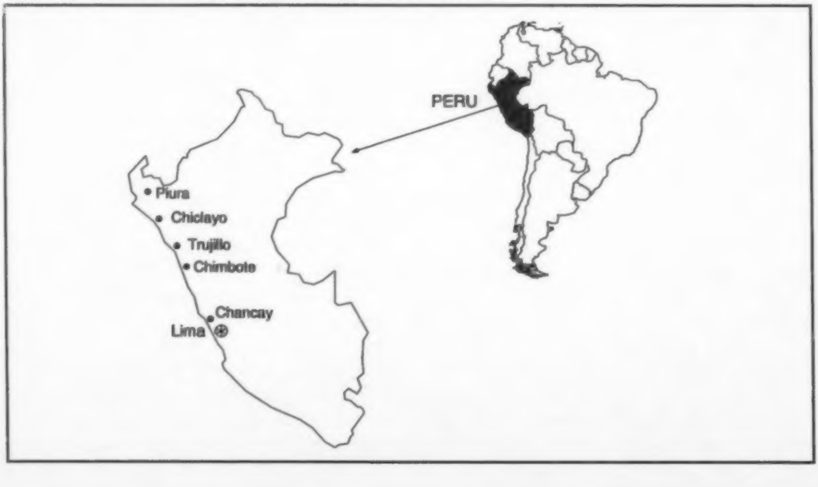
Cholera — Peru, 1991

On January 29, 1991, the General Office of Epidemiology, Ministry of Health (MOH) in Lima, Peru, received reports of an increase in gastroenteritis in Chancay, a coastal district approximately 1½ hours by road north of Lima (Figure 1). On January 30, teams from the Field Epidemiology Training Program (FETP), Division of Epidemiology, MOH, traveled to Chancay to investigate this problem.

Investigation identified an outbreak of diarrheal illness that had begun on January 23. Illness in initial cases was characterized by voluminous watery diarrhea, vomiting, and to a lesser extent, severe muscle cramping. *Vibrio cholerae* O1, Inaba, biotype El Tor, was isolated from patients' stools from Chancay and Chimbote by the National Institute of Health, MOH; Cayetano Heredia University; and the Navy Army Medical Research Institute Detachment and was confirmed by CDC. Additional cases of gastroenteritis have been reported from the cities of Chimbote, Piura, Trujillo, and Chiclayo along the northern coast of Peru (Figure 1).

Active surveillance and a national laboratory network have been implemented throughout the country. From January 24 through February 9, 1859 persons with

FIGURE 1. Locations of cholera cases — Peru, 1991



Cholera — Continued

gastroenteritis who required hospitalization and 66 deaths were reported to the MOH. Epidemiologic investigations are being carried out by FETP residents to further define the extent of the epidemic and the mode of transmission. As a result of the epidemic, a national permanent Committee of Epidemiologic Surveillance has been established. The general population has been alerted to ongoing activity, and information on preventive measures has been widely disseminated through the media. The MOH has recommended 1) the exclusive use of boiled water for drinking, 2) careful cleaning of fruit and vegetables, and 3) avoidance of raw or inadequately cooked fish or seafood.

Reported by: C Vidal Layseca, MD, Minister of Health and Social Services, Lima; C Carrillo Parodi, MD, Director, National Institutes of Health, Lima; L Seminario Carrasco, MD, Director, General Office of Epidemiology, Lima; Field Epidemiology Training Program, Lima; Laboratory of Cayetano Heredia Univ, Lima, Peru. Navy Army Medical Research Institute Detachment, Lima, Peru. Enteric Diseases Br, Div of Bacterial Diseases, Center for Infectious Diseases; Global EIS Program, International Br, Div of Field Epidemiology, Epidemiology Program Office, CDC.

Editorial Note: The appearance of cholera in several towns along the Peruvian seacoast represents the first time this century that epidemic cholera has been identified in South America. During the 19th century, epidemic cholera affected the Americas in several pandemic waves. The pandemic of cholera that began in Southeast Asia in 1961 affected many areas of Asia, the Middle East, Europe, Oceania, and Africa but apparently did not reach the American continents. An endemic focus of a unique Western Hemisphere strain exists along the coast of Louisiana and Texas, and possibly northern Mexico (*1*). Isolates from Peru are being examined to determine their relation to the pandemic or Western Hemisphere strains.

Following its introduction in sub-Saharan Africa in 1970, cholera was initially confined to coastal regions but spread following rivers and the routes of traders and travelers (*2*). The El Tor pandemic strain grows in many foods and can persist in aquatic environments. After initial outbreaks, cholera can disappear or become endemic and remain a public health threat. High attack rates are more common in areas with poor sanitation and inadequate water supplies. In previous epidemics, documented vehicles of transmission have included contaminated water, raw or undercooked shellfish and other seafood, moist-grain gruels, and leftover rice.

When the profuse watery diarrhea and vomiting associated with severe cholera are not treated, patients may die from dehydration in hours. Treatment with oral and, if necessary, intravenous rehydration can decrease death rates of severe cholera from 50% to 1%–2%. Therapeutic antibiotics can decrease the volume of stool produced. Mass chemoprophylaxis, vaccination, and quarantine have proven ineffective and can divert valuable resources from efforts to ensure adequate treatment of cases and control of transmission (*3*).

The impact of epidemic cholera can be diminished by organized control efforts. Public health officials should establish surveillance networks in areas with cholera, or at risk for cholera, and establish oral rehydration facilities throughout the country. Epidemiologic investigations, such as that being conducted by the Peruvian FETP (*4,5*) of the MOH, can help control efforts by determining the extent and source of outbreaks.

The risk to U.S. travelers of acquiring cholera in endemic areas is low. During the first 20 years of the current pandemic, only 10 cases of cholera in U.S. travelers were reported to CDC—representing a risk of acquiring a reported case of cholera of less than one per 500,000 returning travelers (*6*). Cholera vaccination confers only brief and incomplete protection and is not recommended. The usual precautions to

Cholera — Continued

prevent traveler's diarrhea should be observed carefully (*7*); particularly, raw seafood and potentially contaminated water should be avoided. A traveler who develops severe watery diarrhea, or diarrhea and vomiting, during or following travel to an area with known cholera should seek medical attention immediately.

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